CHAPTER 8

RYE

8.1 GENERAL INFORMATION

a. All quantities referenced in this chapter are approximate unless otherwise specified.

b. Use an approved divider to obtain subportions of a sample for analysis unless otherwise specified.

c. If an approved mechanical shaker is unavailable, inspectors may handsieve the sample. When handsieving, hold the sieve level in both hands with elbows close to the sides. In a steady motion, move the sieve from left to right approximately 10 inches and then return from right to left. Repeat this motion 30 times.

d. For specific grain interpretive line slides, see RY-1.0 - RY-5.0.

e. Official inspection personnel shall document inspection information during sampling and grading. See Book IV, chapter 2.

The inspection process provides various factor information used to determine grade and to provide further information on the condition or quality of rye. Each section of this chapter provides details on recording factor information. If requested by the applicant for inspection, additional information may be provided (e.g., an exact count on stones in addition to the percentage by weight, a percentage for a specific type of damage, etc.).

8.2 GRADES AND GRADE REQUIREMENTS

There are no classes or subclasses in rye. Rye is divided into four numerical grades and U.S. Sample grade. Special grades are provided to emphasize special qualities or conditions affecting the value of the rye and are added to and made a part of the grade designation. Special grades do not affect the numerical or sample grade designation.

TABLE NO. 1 - GRADES AND GRADE REQUIREMENTS - RYE

Grade	Minimum test weight per bushel (pounds)	Maximum limits of--				
		Foreign material		Damaged kernels		
		Foreign matter other than wheat (percent)	Total (percent)	Heat damaged (percent)	Total (percent)	Thin rye (percent)
U.S. No. 1	56.0	1.0	3.0	0.2	2.0	10.0
U.S. No. 2	54.0	2.0	6.0	0.2	4.0	15.0
U.S. No. 3	52.0	4.0	10.0	0.5	7.0	25.0
U.S. No. 4	49.0	6.0	10.0	3.0	15.0	--

U.S. Sample grade:

U.S. Sample grade is rye that:

(a) Does not meet the requirements for the grades U.S. Nos. 1, 2, 3, or 4; or

(b) Contains 8 or more stones or any number of stones which have an aggregate weight in excess of 0.2 percent of the sample weight, 2 or more pieces of glass, 3 or more crotalaria seeds (Crotalaria spp.), 2 or more castor beans (Ricinus communis L.), 4 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic foreign substance(s), 2 or more rodent pellets, bird droppings, or an equivalent quantity of other animal filth per 1⅛ to 1¼ quarts of rye; or

(c) Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor); or

(d) Is heating or otherwise of distinctly low quality.

8.3 GRADE DESIGNATIONS

Use the following guidelines when assigning grades on work records and certificates.

a. The letters "U.S.,"

b. The abbreviation "No." and the number of the grade or the words "Sample Grade,"

c. The words "or better" when applicable,

d. The special grade "Plump" when applicable,

e. The word "rye,"

f. The applicable special grade in alphabetical order, and

g. The word "dockage" (when applicable) and the percentage thereof.

8.4 SPECIAL GRADES

Special grades draw attention to unusual conditions in grain and are made part of the grade designation. The definitions and examples of the designations for special grades in rye are:

a. Ergoty Rye. Rye that contains more than 0.30 percent of ergot.

Example: U.S. No. 1 rye, Ergoty, Dockage 2.0%

b. Garlicky Rye. Rye that contains in a 1,000-gram portion more than six green garlic bulblets or an equivalent quantity of dry or partly dry bulblets.

Example: U.S. No. 3 rye, Garlicky

c. Infested Rye. Rye that is infested with live weevils or other insects injurious to stored grain.

Example: U.S. No. 1 rye, Infested

d. Light Garlicky Rye. Rye that contains in a 1,000-gram portion two or more, but not more than six, green garlic bulblets or an equivalent quantity of dry or partly dry bulblets.

Example: U.S. No. 1 rye, Light garlicky

e. Light Smutty Rye. Rye that has an unmistakable odor of smut, or that contains in a 250-gram portion smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 14 smut balls but not in excess of a quantity equal to 30 smut balls of average size.

Example: U.S. No. 3 rye, Light smutty

f. Plump Rye. Rye that contains not more than 5.0 percent of rye and other matter that passes through a 0.064 X 3/8 oblong-hole sieve.

Example: U.S. No. 1 Plump rye

g. Smutty Rye. Rye that contains in a 250-gram portion smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 30 smut balls of average size.

Example: U.S. No. 2 rye, Smutty

8.5 OPTIONAL GRADE DESIGNATION

The Official U.S. Standards for Grain provide for an optional grade designation, commonly referred to as "or better." Upon the request of an applicant, rye may be certified as U.S. No. 2 or better, U.S. No. 3 or better, etc. An "or better" grade designation cannot be applied to a U.S. No. 1 grade designation.

Example: U.S. No. 3 or better rye, Dockage 2.0%

8.6 BASIS OF DETERMINATION

Distinctly Low Quality. The determination of distinctly low quality is made on the basis of the lot as a whole at the time of sampling when a condition exists that may or may not appear in the representative sample and/or the sample as a whole.

Certain Quality Determinations. Each determination of rodent pellets, bird droppings, other animal filth, broken glass, castor beans, cockleburs, crotalaria seeds, dockage, garlic, live insect infestation, large stones, moisture, temperature, an unknown foreign substance(s), and a commonly recognized harmful or toxic substance(s) is made on the basis of the sample as a whole. When a condition exists that may not appear in the representative sample, the determination may be made on the basis of the lot as a whole at the time of sampling according to procedures prescribed in FGIS instructions.

All Other Determinations. Other determinations not specifically provided for under the General Provisions are made on the basis of the grain when free from dockage, except the determination of odor is made on either the basis of the grain as a whole or the grain when free from dockage.

TABLE NO. 2

BASIS OF DETERMINATION		
Lot as a Whole	Factors Determined Before the Removal of Dockage	Factors Determined After the Removal of Dockage
Distinctly low quality Heating Infested Odor	Distinctly low quality Garlicky Heating Infested Kind of grain Moisture Odor Odor (smut) U.S. Sample grade factors	Damaged kernels Ergot Foreign material Heat-damaged kernels Kind of grain Odor Plump Smut Stones Test weight Thin

The following sections of this chapter are arranged in a logical sequence typically followed in the inspection and grading of rye.

8.7 DEFINITION OF RYE

Rye is defined as:

Grain that, before the removal of dockage, consists of 50 percent or more of common rye (Secale cereale L.) and not more than 10 percent of other grains for which standards have been established under the United States Grain Standards Act and that, after the removal of dockage, contains 50 percent or more of whole rye.

Whole kernels are kernels with three-fourths or more of the kernel present. Other grains for which standards have been established are barley, canola, corn, flaxseed, oats, sorghum, soybeans, sunflower seed, triticale, and wheat.

Basis of Determination. Normally, a visual appraisal of the sample is sufficient to determine if it meets the definition of rye. However, if an analysis is necessary, make the determination on a portion of 50 grams. Determine the percentage of rye and other grains before the removal of dockage. Determine the percentage of whole kernels after the removal of dockage.

If the sample does not meet the definition of rye, examine it further to determine if it is:

a. Another grain for which standards have been established or

b. Not standardized grain. No further analysis is necessary on a sample designated as not standardized grain unless a specific factor test is requested.

8.8 HEATING

Rye developing a high temperature from excessive respiration is considered heating. Heating rye, in its final stages, will usually have a sour or musty odor. Care should be taken not to confuse rye that is heating with rye that is warm and moist because of storage in bins, railcars, or other containers during hot weather.

Basis of Determination. Determine heating on evidence obtained at the time of sampling or on the basis of the sample as a whole.

Certification. Grade heating rye as U.S. Sample grade and record the word "Heating" in the "Remarks" section of the certificate.

8.9 ODOR

Basis of Determination. Determine odor on evidence obtained at the time of sampling or on the sample either before or after the removal of dockage.

TABLE NO. 3

ODOR CLASSIFICATION EXAMPLES		
Sour	Musty	Commercially Objectionable Foreign Odors
Boot Fermenting Insect (acrid) Pigpen	Earthy Insect Moldy	Animal hides Decaying animal and vegetable matter Fertilizer Fumigant Insecticide Oil products Skunk Smoke Strong weed

Commercially Objectionable Foreign Odors. Commercially objectionable foreign odors are odors, except smut and garlic odors, foreign to grain that render it unfit for normal commercial usage.

Fumigant or insecticide odors are considered commercially objectionable foreign odors if they linger and do not dissipate. When a sample of rye contains a fumigant or insecticide odor that prevents the determination as to whether any other odor(s) exists, apply the following guidelines:

a. Original Inspections. Allow the work portion to aerate in an open container for 4 hours, or less, if the odor dissipates in less time.

b. Reinspections, Appeal and Board Appeal Inspections. Allow unworked file samples and new samples to aerate in an open container for 4 hours, or less, if the odor dissipates in less time. The 4-hour aeration requirement does not apply when the original work portion was aerated and retained as the final file.

Consider the sample as having a commercially objectionable foreign odor if the fumigant or insecticide odor persists based on the above criteria.

Final Determination. The inspector(s) is responsible for making the final determination for all odors. A consensus of experienced inspectors is used, whenever possible, on samples containing marginal odors. The consensus approach is not required if no odor or a distinct odor is detected.

Certification. Grade rye containing a "distinct" musty, sour, or commercially objectionable foreign odor as U.S. Sample grade. Record the words "Musty," "Sour," or "Commercially Objectionable Foreign Odor" in the "Remarks" section of the certificate.

8.10 INFESTED RYE

Infested rye is rye that is infested with live weevils or other live insects injurious to stored grain.

The presence of any live weevil or other live insects injurious to stored grain indicates the probability of infestation and warns that the rye must be carefully examined to determine if it is infested. In such cases, examine the work sample and file sample before reaching a conclusion as to whether or not the rye is infested. Do not examine the file sample if the work portion is insect free.

Live weevils shall include rice weevils, granary weevils, maize weevils, cowpea weevils, and lesser grain borers. Other live insects injurious to stored grain shall include grain beetles, grain moths, and larvae. (See Chapter 1, Section 1.2, Visual Grading Aids.)

Basis of Determination. Determine infestation on the lot as a whole and/or the sample as a whole. For insect tolerances, see table No. 4.

TABLE NO. 4

INSECT INFESTATION
Samples meeting or exceeding any one of these tolerances are infested: ***2 lw, or 1 lw + 1 oli, or 2 oli***
I. 1,000-Gram Representative Sample 1/ (+ file sample if needed) - Submitted Samples - Probed Lots - D/T Sampled Landcarriers
II. Lot as a Whole (Stationary) - Probed Lots (at time of sampling)
III. Online Sample (In-Motion) 2/ - Railcars Under Cu-Sum - Subsamples for Sacked Grain Lots - Components for Bargelots 3/ - Components for Shiplots 3/
1/ Examine work portion and file sample if necessary. Do not examine file sample if work portion is insect free. 2/ Minimum sampling rate is 500 grams per 2,000 bushels. 3/ Minimum component size is 10,000 bushels. Key: lw = live weevil oli = other live insects injurious to stored grain

Certification. When applicable, record the word "Infested" on the certificate in accordance with Section 8.4, Special Grades.

8.11 GARLICKY AND LIGHT GARLICKY RYE

Garlicky. *Rye that contains in a 1,000-gram portion more than six green garlic bulblets or an equivalent quantity of dry or partly dry bulblets.*

Light Garlicky Rye. *Rye that contains in a 1,000-gram portion two or more, but not more than six, green garlic bulblets or an equivalent quantity of dry or partly dry bulblets.*

Basis of Determination. Determine garlicky and light garlicky before the removal of dockage on a portion of 1,000 grams. (Reference: Interpretive Line Slide Nos. OF-13.0 and OF-13.1.)

Characteristics of Bulblets.

a. Green garlic bulblets are bulblets which have retained all of their husks intact.

b. Dry or partly dry garlic bulblets are bulblets which have lost all or part of their husks. Consider bulblets with cracked husks as dry.

NOTE: Three dry or partly dry garlic bulblets are equal to one green bulblet.

Garlic bulblets apply in the determination of "Garlicky" and "Light Garlicky" but also function as dockage or foreign material.

Certification. When applicable, grade the rye "Garlicky" or "Light Garlicky" in accordance with Section 8.4, Special Grades. Upon request, record the number of garlic bulblets in whole and thirds.

8.12 DISTINCTLY LOW QUALITY

Consider rye distinctly low quality when it is obviously of inferior quality and the existing grade factors or guidelines do not properly reflect the inferior condition.

Basis of Determination. Use all available information to determine distinctly low quality. This includes a general examination of the rye during sampling and an analysis of the obtained sample(s).

Large Debris. Rye containing two or more stones, pieces of glass, pieces of concrete, or other pieces of wreckage or debris which are visible to the sampler and too large to enter the sampling device is considered distinctly low quality.

Other Unusual Conditions. Rye that is obviously affected by other unusual conditions which adversely affect the quality of the rye and cannot be properly graded by use of the grading factors specified or defined in the standards is considered distinctly low quality.

Rye suspected of containing diatomaceous earth is considered distinctly low quality unless the applicant specifically requests an examination to verify the presence of diatomaceous earth. If the laboratory examination verifies that the rye contains diatomaceous earth, then the rye is not considered distinctly low quality due to diatomaceous earth. Refer to Program Directive 9180.49, Grading and Certification of Grain Containing Diatomaceous Earth and Silica Gel, for additional information regarding the testing of rye for diatomaceous earth.

Certification. Grade distinctly low quality rye as U.S. Sample grade. Record the words "Distinctly Low Quality" and the reason(s) why in the "Remarks" section of the certificate.

8.13 U.S. SAMPLE GRADE CRITERIA

Basis of Determination. Determine U.S. Sample grade criteria, except for stones, before the removal of dockage based on a work portion of 1,000 - 1,050 grams. Determine stones on a dockage-free portion. Table No. 5 shows the criteria and corresponding interpretive line slides, tolerance limits, and the appropriate basis of determination. Consider identifiable pieces of grain, processed grain products (e.g., soybean meal, sorghum grits, corn meal, bulgur, etc.), or feed pellets in grain as foreign material. Unidentifiable materials or material unrelated to grain shall function as "unknown foreign substance."

TABLE NO. 5

U.S. SAMPLE GRADE CRITERIA

Criteria	*Line Slide*	*Number/Weight* 1/ *Sample Basis*	*Lot Basis* 2/
Any numerical grading factor		Excess of limit for U.S. No. 4	N/A
Animal filth	OF-1.0	2 or more	N/A
Castor beans	OF-3.0	2 or more	N/A
Crotalaria seeds	OF-8.0	3 or more	N/A
Glass		2 or more	N/A
Odor		Presence	N/A
Stones		8 or more or any number in excess of 0.2% by weight	N/A
Unknown foreign substances 3/	OF-31.0	4 or more	N/A
Heating		Presence	Presence
Large debris *		N/A	2 or more
Other unusual conditions *		Presence	Presence

1/ Record count factors to the nearest whole number.
2/ The entire sample of a submitted sample is considered as the lot.
3/ Consider feed pellets and processed grain products as foreign material not unknown foreign substance.

* For Distinctly Low Quality, see section 8.12.

Certification. Grade rye U.S. Sample grade when one or more of the limits in table 5 are observed. Record the reason(s) why in the "Remarks" section of the certificate. Record count factors to the nearest whole number.

8.14 MOISTURE

Water content in grain as determined by an approved device according to procedures prescribed in FGIS instructions.

Basis of Determination. Determine moisture before the removal of dockage on a portion of exactly 250 grams.

The procedures for performing a moisture determination using the Motomco moisture meter are described in book II, chapter 1, section 1.10.

Certification. Record the percent of moisture on the certificate to the nearest tenth percent.

8.15 DOCKAGE

All matter other than rye that can be removed from the original sample by use of an approved device in accordance with procedures prescribed in FGIS instructions. Also, underdeveloped, shriveled, and small pieces of rye kernels removed in properly separating the material other than rye and that cannot be recovered by properly rescreening and recleaning.

Basis of Determination. Determine dockage on a portion of 1,000 - 1,050 grams of the original sample.

When performing the dockage determination, check the material that passes over the riddle for threshed and sprouted kernels of rye.

Threshed and sprouted kernels of rye that pass over the riddle are not considered dockage. Return them to the dockage-free sample. Threshed kernels of rye are kernels with either no glumes attached or not more than one glume attached.

Consider unthreshed kernels of rye that pass over the riddle as dockage. Unthreshed kernels are kernels with glumes attached.

CHART 1 - PROCEDURE FOR DETERMINING DOCKAGE

Carter Dockage Tester Setup

a. Set air control on 4 and the feed control to 6.

b. Insert the No. 25 plastic riddle in the riddle carriage.

c. Use no sieve in the top sieve carriage.

d. Insert the No. 2 sieve in the middle and bottom sieve carriages.

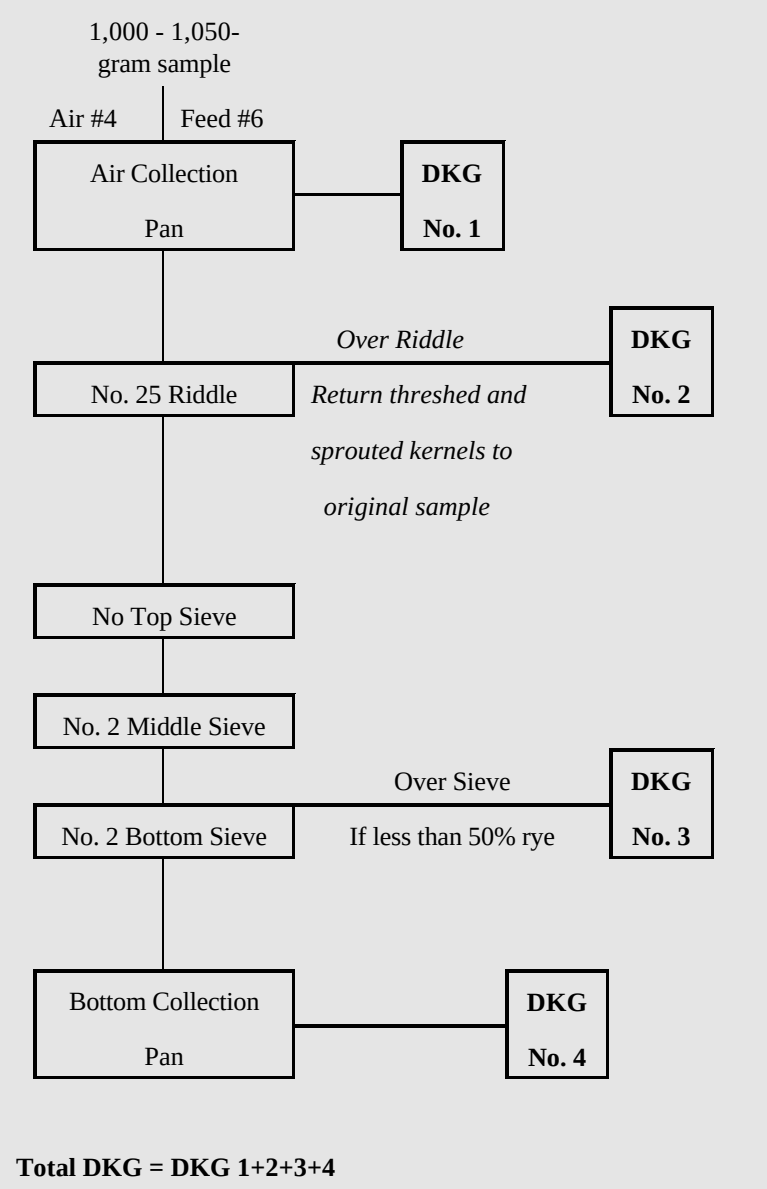
e. Start the Carter Dockage Tester and pour sample into feed hopper.

f. Aspirated material in air collection pan is dockage.

g. Material over the riddle, except for threshed and sprouted kernels, is dockage.

h. Material that passed through the bottom sieve is dockage.

i. Material passing over the bottom sieve is dockage if it contains less than 50 percent by weight of rye. When the material consists of more than 50 percent by weight of rye, return it to the cleaned rye.



Total DKG = DKG 1+2+3+4

To avoid repeating operations, check the dockage for garlic bulblets, infestation, and U.S. Sample grade factors (except stones). (See sections 8.10, 8.11, and 8.13.)

Certification. Record the word "Dockage" and the percentage to the nearest tenth percent on the work record and the certificate. If the dockage is less than one-tenth percent, report as "Dockage 0.0%."

Additional Dockage Procedures. When rye contains wild buckwheat or similar seeds or flaxseed, determine dockage as follows:

a. Rye Containing Wild Buckwheat or Similar Seeds. If it appears that the sample contains more than 0.5 percent of wild buckwheat or similar seeds, analyze a portion of approximately 50 grams of the original sample before the removal of dockage. If the portion contains more than 0.5 percent of wild buckwheat or other similar sized seeds, proceed as follows: (Reference: Interpretive Line Slide No. OF-27.0.)

(1) Set up the Carter dockage tester as follows:

(a) Set the air control at 4;

(b) Set the feed control at 6;

(c) Insert a Number 25 riddle in the riddle carriage;

(d) Use no sieve in the top sieve carriage;

(e) Insert a Number 6 sieve in the middle sieve carriage; and

(f) Insert a Number 2 sieve in the bottom sieve carriage.

(2) When the sample has been run, place approximately 50 grams of the material that passed over the Number 2 sieve (bottom collection pan) on the upper edge of a 5/64 (1.984 mm) equilateral triangular hand sieve. Hold the sieve at a 10- to 20-degree angle and work the material down over the sieve with a gentle side-to-side motion.

(3) Repeat "Step 2" on additional 50-gram portions until all material that passed over the Number 2 sieve has been sieved.

(4) If the material remaining on top of the sieve consists of 50 percent or more of whole or broken kernels of rye, return it to the sieved sample. Otherwise, add it to the dockage.

(5) Examine the material that passed through the sieve. If the material consists of 50 percent or more by weight of whole or broken kernels of rye, repeat the sieving process on 50-gram portions of all the material that passed through the sieve. Do not perform this hand sieving process more than twice.

(6) Dockage will then consist of:

(a) The material removed by the aspirator (air collection pan).

(b) The coarse material, except threshed and sprouted kernels of rye, that passed over the riddle (riddle collection pan).

(c) The material that passed through the Number 2 sieve (bottom collection pan).

(d) The material that passed through the hand sieve.

(e) The material that remained on the hand sieve when the material consists of less than 50 percent by weight of rye.

b. Rye Containing Canola or Flaxseed. There are occasional samples that will contain canola or flaxseed after the dockage is removed. In such cases, separate the canola or flaxseed from the cleaned rye. If it appears that the sample contains 0.1 percent or more of canola/flaxseed, analyze a dockage-free portion of 50 grams. If the representative portion contains 0.3 percent or more of canola/flaxseed, sieve the entire dockage-free sample with either a 3/64 x 3/8 hand sieve or a 0.064 x 3/8 hand sieve, depending on which sieve is more appropriate in relation to the size of the rye and canola/flaxseed kernels in the sample. To remove the canola/flaxseed, use one of the following methods:

(1) Mechanical Sieving Method.

(a) Mount the sieve and a bottom pan on an approved mechanical sieve shaker.

(b) Follow the procedures described in Book II, Chapter 1, Section 1.13, Mechanical Sieve Shaker.

(c) Place one-fourth of the dockage-free portion on the sieve.

(d) Set the stroke counter at 30 strokes.

(e) When the shaker has stopped, return the material lodged in the perforations to the rye remaining on top of the sieve.

(f) Clean the sieve and repeat this procedure with the three remaining similar-sized portions.

(2) Hand-Sieving Method.

(a) Mount the approved sieve on a bottom pan.

(b) Place one-fourth of the dockage-free portion in the center of the sieve.

(c) Hold the sieve level in both hands with elbows close to the sides and the sieve perforations parallel to the direction of movement.

(d) In a steady motion, move the sieve from left to right approximately 10 inches and then return from right to left.

(e) Repeat this operation 30 times.

(f) Return the material lodged in the perforations to the rye remaining on top of the sieve.

(g) Clean the sieve and repeat this procedure with the three remaining similar-sized portions.

(3) Consider all material which passed through the sieve as dockage and add it to the dockage previously removed.

8.16 TEST WEIGHT

The weight per Winchester bushel (2,150.42 cubic inches) as determined using an approved device according to procedures prescribed in FGIS instructions.

Basis of Determination. Determine test weight on a dockage-free portion of sufficient quantity to overflow the kettle.

The procedures for performing the test weight determination and available services are described in book II, chapter 1, section 1.11.

Certification. Record test weight results on the work record as displayed on the electronic scale or in whole and tenth pounds to the nearest tenth pound. Record the test weight on the certificate in whole and tenth pounds to the nearest tenth pound. If requested, convert the pounds per bushel (lbs./bu) result to kilograms per hectoliter (kg/hl) using the following formula: lbs./bu x 1.287 = kg/hl and record in the "Remarks" section in whole and tenths.

8.17 PROCESSING THE WORK SAMPLE

At this point, determinations have been made for odor, test weight, moisture, dockage, infestation, and sample grade factors. Now divide the work sample into fractional portions for those determinations required after the removal of dockage. The following chart and table No. 6 illustrate how the sample is divided into fractional parts using the Boerner divider.

CHART 2 - DIVIDING THE WORK SAMPLE

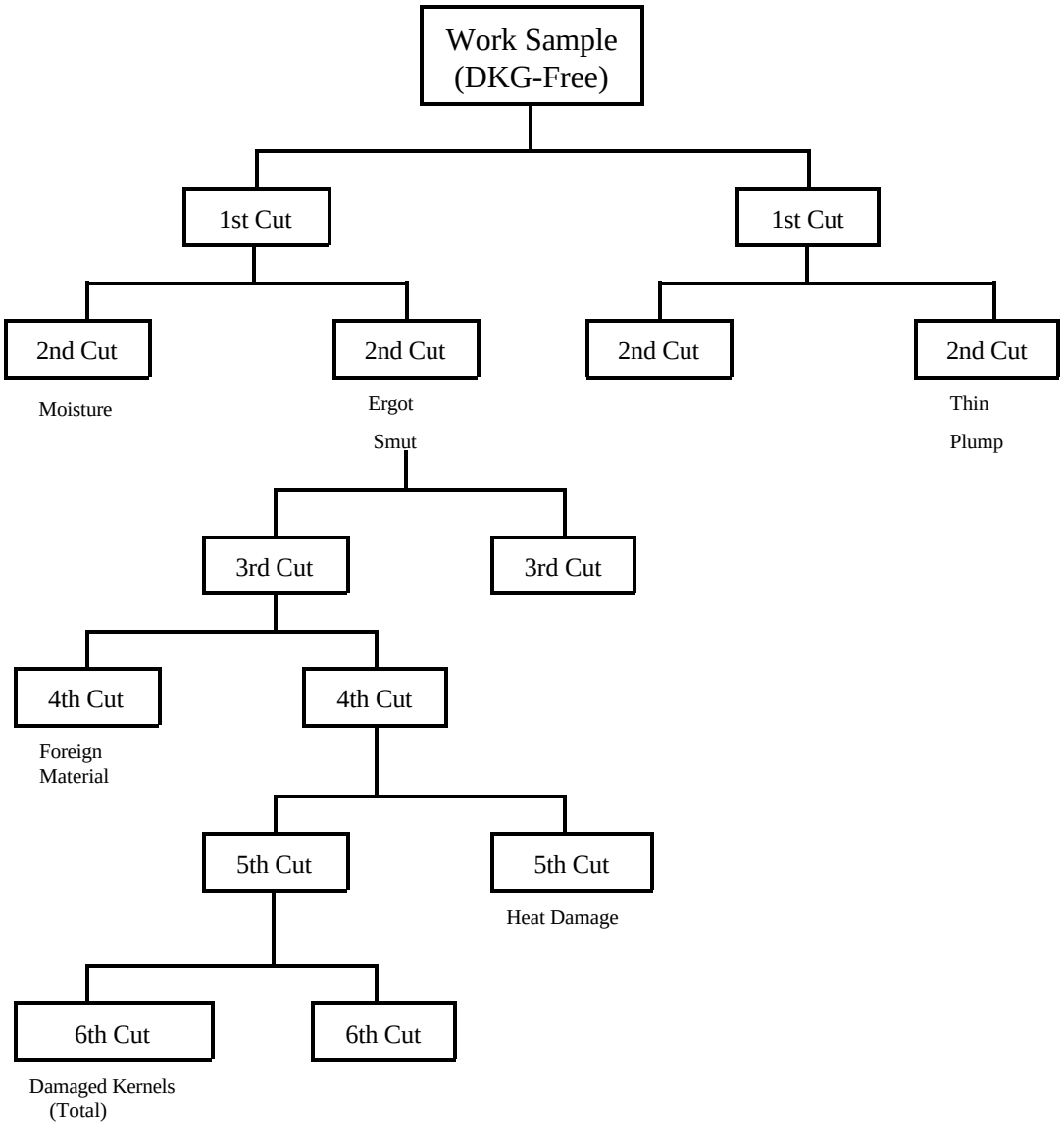


TABLE NO. 6

APPROXIMATE ANALYTICAL PORTION SIZES	
Factors	Grams
Damaged kernels	15
Ergot	250
Foreign material	50
Heat-damaged kernels	30
Plump	250
Smut	250
Thin	250

8.18 SMUTTY AND LIGHT SMUTTY RYE

Smutty Rye. *Rye that contains in a 250-gram portion smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 30 smut balls of average size.*

Light Smutty Rye. *Rye that has an unmistakable odor of smut, or that contains in a 250-gram portion smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 14 smut balls but not in excess of a quantity equal to 30 smut balls of average size*.

Smut is a plant disease characterized by the appearance of smut balls or smut spores.

Basis of Determination. Determine "Smutty" on a dockage-free portion of 250 grams. Determine "Light smutty" on the sample as a whole (odor only) or on a dockage-free portion of 250 grams. Smut balls also function as foreign matter other than wheat.

Certification. Record the words "Smutty," or "Light smutty" on the certificate in accordance with Section 8.4, Special Grades. Upon request, record the odor (in the case of Light smutty) or number of smut balls on the work record and the certificate.

8.19 ERGOTY RYE

Rye that contains more than 0.30 percent of ergot.

Ergot is a hard, reddish-brown or black grain-like mass of certain parasitic fungi that replaces the kernel of rye. (Reference: Interpretive Line Slide No. OF-12.0.)

Basis of Determination. Determine ergoty on a dockage-free portion of 250 grams. Ergot applies in the determination of ergoty but also functions as foreign matter other than wheat.

Certification. When applicable, record the word "Ergoty" on the certificate in accordance with Section 8.4, Special Grades. Upon request, record the percentage of ergot to the nearest hundredth percent in the "Remarks" section of the certificate.

8.20 THIN AND PLUMP RYE

Thin Rye. *Rye and other matter that passes through a 0.064 x 3/8 oblong-hole sieve after sieving according to procedures prescribed in FGIS instructions*.

Plump Rye. *Rye that contains not more than 5.0 percent of rye and other matter that passes through a 0.064 X 3/8 oblong-hole sieve*.

Basis of Determination. Determine thin and plump on a dockage-free portion of 250 grams using one of the following methods:

a. Mechanical Sieving Method.

(1) Mount the 0.064 x 3/8 inch (1.626 x 9.525 mm) oblong-hole sieve and a bottom pan on the mechanical sieve shaker.

(2) Set the stroke counter for 30 strokes.

(3) Follow the procedures described in Book II, Chapter 1, Section 1.13, Mechanical Sieve Shaker.

(4) Consider all material passing through the sieve as thin rye.

(5) Consider all material remaining on top of the sieve as plump rye. Return the material lodged in the perforations to the rye on top of the sieve.

b. Hand Sieving Method.

(1) Mount the 0.064 x 3/8 inch (1.626 x 9.525 mm) oblong-hole sieve on a bottom pan.

(2) Place the 250-gram portion in the center of the sieve.

(3) Hold the sieve level in both hands with elbows close to the body and the sieve perforations parallel to the direction of movement.

(4) In a steady motion, move the sieve from left to right approximately 10 inches and then return from right to left.

(5) Repeat this operation 30 times.

(6) Consider all material passing through the sieve as thin rye.

(7) Consider all material remaining on top of the sieve as plump rye. Return the material lodged in the perforations to the rye on top of the sieve.

Rye graded U.S. No. 1 may contain not more than 10.0 percent, U.S. No. 2 not more than 15.0 percent, and in U.S. No. 3 not more than 25.0 percent of thin rye.

Certification. When applicable, record the percentage of thin rye on the certificate to the nearest tenth percent.

When applicable, plump becomes a part of the grade designation and is shown on the certificate in accordance with Section 8.3, Grade Designations.

8.21 FOREIGN MATERIAL

All matter other than rye that remains in the sample after the removal of dockage.

Basis of Determination. Determine foreign material on a dockage-free portion of 50 grams.

In rye, the factor foreign material is divided into (1) foreign matter other than wheat and (2) foreign material (total).

a. Foreign Material (Total). Remove all matter other than rye from the representative portion and determine the percentage of foreign material (total).

b. Foreign Matter Other Than Wheat. Remove the wheat from the total foreign material separation. The percentage of foreign matter other than wheat is then based on the remaining foreign material after the removal of the wheat.

Certification. Record the percentages of foreign matter other than wheat and foreign material (total) on the certificate to the nearest tenth percent.

8.22 DAMAGED KERNELS

Kernels, pieces of rye kernels, and other grains that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

Basis of Determination. Determine damaged kernels on a dockage-free portion of 15 grams.

In general, kernels of rye and other grains are considered damaged for inspection and grading purposes only when the damage is distinctly apparent and of such character as to be recognized as damaged for commercial purposes.

TYPES OF RYE DAMAGE.

Germ-Damaged Kernels (sick and/or mold). Kernels in which the germ is discolored or moldy as a result of respiration. The bran coat should be removed carefully because scraping too deeply could remove the damage. (Reference: Interpretive Line Slide No. RY-1.0.)

Sprout-Damaged Kernels. Kernels that have the germ end broken open from germination and show a sprout and kernels that have sprouted but which have the sprouts broken off.

Kernels from which the germs have been chewed are considered sound kernels unless otherwise damaged. Do not confuse insect-chewed germs with sprout sockets.

At times, rye can present a ragged appearance, particularly after excessive handling. In many cases, the germ ends are slightly rubbed off, giving these kernels the appearance of having been sprouted. Close examination, however, usually indicates that the kernels have not sprouted but that the ends have merely been rubbed off through excessive handling. Such kernels, unless otherwise damaged, are considered sound. (Reference: Interpretive Line Slide No. RY-3.1.)

Insect-Bored Kernels. Kernels which have been bored or tunneled by insects. (Reference: Interpretive Line Slide No. RY-4.0.)

Other Damaged Kernels. Kernels which have cracks, breaks, are chewed, contain mold or fungus, or are diseased. (Reference: Interpretive Line Slide No. RY-5.0.)

Certification. Record the percent of damaged kernels to the nearest tenth percent on the certificate.

8.23 HEAT-DAMAGED KERNELS

Kernels, pieces of rye kernels, and other grains that are materially discolored and damaged by heat.

Basis of Determination. Determine heat-damaged kernels on a dockage-free portion of 30 grams.

In most cases, it is necessary to cross-section the kernels to determine if they are heat-damaged. Heat-damaged kernels are kernels which are reddish-brown, mahogany, or creamy in cross-section.

Certification. Record the percent of heat-damaged kernels to the nearest tenth percent on the certificate.